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Joseph T. Mahoney
Department of Business Administration

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JUL 12 1991

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FACULTY WORKING PAPER NO. 91-0144

College of Commerce and Business Administration

University of Illinois at Urbana-Champaign

June 1991

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Joseph T. Mahoney

Department of Business Administration
University of Illinois -- Urbana 1206 S. Sixth
Champaign, IL 61820
(217) 244-8257

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ABSTRACT

I argue in this paper that an integrated organizational economics research program is a feasible, challenging and rewarding endeavor within the conversation of strategic management. Toward that end, six major theories from organizational economics are reviewed and interrelated. It is suggested that content (deductive economics) and process (cognitive psychology) research need to be joined in the next generation of organizational economics research.

ORGANIZATIONAL ECONOMICS WITHIN THE CONVERSATION OF STRATEGIC MANAGEMENT

While in the process of writing this chapter on organizational economics, I posed the following set of questions: Suppose I were asked to lecture on organizational economics for one of the strategy courses at my university; What would be the significant themes that I would want to convey to students so that they could apprehend the directional tendencies of organizational economics today? How did current positions evolve? What are the unresolved issues in this field that are especially relevant to strategy research?

Organizational economics will be defined in this paper as a hybrid of six distinct (but interrelated) research programs: (1) A behavioral theory of the firm; (2) A transaction costs theory of the firm; (3) A property rights theory of the firm; (4) An agency theory of the firm; (5) A resource-based theory of the firm; and (6) An evolutionary theory of the firm. While Barney and Ouchi (1986, p.15) provide valuable insights concerning the connections between microeconomic theory and organization theory, this paper attempts to go beyond this initial synthesis to more specifically coalesce microeconomic theories in these six fields of research.

I regard organizational economics as good management science, properly speaking, because it stimulates conversation within the discipline of management (Barney, 1990; Donaldson 1990b; Hesterly, Liebeskind & Zenger, 1990). Ultimately, good science is good conversation between good people speaking well (McCloskey, 1985; Morgan, 1983; Oakeshott, 1962).

Intellectual integration and pluralism are valued to a far greater degree in the strategy field (Bourgeois, 1984; Bowman, 1990; Eisenhardt, 1989; Huff, 1981; Jemison, 1981; Mahoney 1992a) than in older and more rigidly defined disciplines (e.g., economics and finance). This fact alone strongly suggests that the integration of the organizational economics paradigm will take place not in the economics discipline, but rather will take place within the conversation of strategic management. To be sure, rigorous disciplinary based research should be valued and the efficiency of a division of labor should be recognized (Camerer, 1985). I simply suggest that a portfolio of skilled human capital (of both a specialist and integrative variety) possessed by heterogenous human beings can be appreciated within the strategy conversation. As Hayek noted long ago: "(The) interaction of individuals, possessing different knowledge and different views, is what constitutes the life of thought" (1944, p. 165).

For those that want a central paradigm in the strategy field and thus might desire a choice between an industrial organization perspective and other lines of strategy research, or even a favored choice from among currently competing lines of thought within one of these fields, the following question is posed: Will you control the paradigm or will the paradigm control you? In any event, I regard the idea of "planning a paradigm" to be absurd. A paradigm is largely a constellation of shared beliefs that emerge among a group of scholars and may be described ex post but cannot be delineated by any one mind ex ante (Kuhn, 1970). A paradigm will be a part of an emergent collective action that we call strategic management. To claim in the beginning of a paper that you are about to lead the way to a new paradigm or scientific revolution is hubris indeed. To plan the growth of knowledge is a

contradiction in terms, even at the individual level, let alone at the level of a scientific community.

My major thesis is that the burden of proof for claiming that theories are incommensurable should be placed on those scholars who make such claims. It has been my observation that Kuhn's (1970) incommensurability thesis has been used, in large measure, to legitimize intellectual vested interests. It's very easy to claim incommensurability. It's an academic way of saying "shut-up; I don't want to have a conversation with you; I am an expert in my field". As Harry Truman said, "An expert is someone who doesn't want to learn anything new, because then he wouldn't be an expert" (McCloskey, 1990, p.111). I concur with Popper's (1970) strong dissent of Kuhn's incommensurability thesis. Bridges may and should be built between contested terrains (Goldberg, 1980).

While this paper provides a rudimentary first step toward intertwining the various strands of the organizational economics literature into one cord, my challenge to the reader is to rationally reconstruct the literature to provide new intellectual combinations of thought. My major contention is that the six microeconomic theories -- the behavioral theory, the transaction cost theory, the property rights theory, the positive agency theory, the resource-based theory and the evolutionary theory -- of the firm are commensurable and share an efficiency (or effectiveness) orientation. Each of the six theories maintains that bounded rationality is a fundamental condition that should not be assumed away when the objective is to understand organizations. I submit that an intellectual integration is feasible and desirable.

The six microeconomic theories of the firm considered here share a common dissatisfaction with the neoclassical model of the firm in which decision

makers optimize and competitive markets coordinate activities efficiently. Firms in neoclassical economic theory are the quintessential "black box" (Barney & Ouchi, 1986). At the risk of being reported to the "society for the prevention of cruelty to straw men", I provide in Table 1 a curmudgeon's list of the shortcomings of the neoclassical model.

Insert Table 1 about here

Of course, as any good academic knows, you can't beat something (neoclassical economics) with nothing. The first part of this paper will therefore consider in turn the substantive contributions of alternative theories of the firm that address the shortcomings of neoclassical economics. The fundamental assumptions of these alternative theories are summarized and compared in Table 2.

Insert Table 2 about here

I. The Behavioral Theory of the Firm

The assumption of perfect or unbounded rationality is a "hard core" premise for some in the economics discipline. Simon (1957, p.198) provides us with some insight on why this is so:

The reluctance of economic theory to relinquish its classical model of economic man is understandable. When even a small concession has been made in the direction of admitting the fallibility of economic man, his psychological properties are no longer irrelevant. Deductive reasoning then no longer suffices for the unique prediction of his behavior without constant assistance from empirical observation.

The fundamental premise upon which the behavioral world is built is the premise that individuals have bounded rationality. Simon (1957, p.198) specifies the basis for this theoretic starting point:

The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problem whose solution is required for objectively rational behavior in the real world -- or even for a reasonable approximation to such objective rationality.

A major consequence of bounded rationality is that intended (and limited) rationality requires a person to construct simplified models. To predict behavior we need to understand how simplified models are constructed and we need to consider the consequences of limited information-processing capacity. As Simon notes (1978, p. 12): "Complexity is deep in the nature of things, and discovering tolerable approximation procedures and heuristics that permit huge spaces to be searched very selectively lies at the heart of intelligence, whether human or artificial".

Hogarth (1987) delineates several other consequences of bounded rationality: (1) selective perception of information; (2) processing is done in an adaptive, sequential manner; (3) heuristic procedures reduce mental effort; and (4) memory works by a process of active reconstruction. Systematic biases result with insensitivity to prior probability of outcomes; insensitivity to sample size; misconceptions of chance; failure to recognize regression toward the mean; biases due to the retrievability of instances; biases due to the effectiveness of a search set; illusory correlation; insufficient adjustment and anchoring; and biases in the evaluation of conjunctive and disjunctive events (Kahneman, Slovic, & Tversky, 1982).

Given the limitations and (systematic) biases of the individual, those operating from a behavioral perspective tend to view the organization as a

more efficient information processor than any given individual. The firm is considered to be an institutional response to uncertainty and bounded rationality at the individual level (Simon, 1947). Indeed, Thompson notes that: "Uncertainty appears as the fundamental problem for complex organizations, and coping with uncertainty, (is) the essence of the administrative process" (Thompson, 1967, p.159).

An important task of the organization from the behavioral perspective is uncertainty absorption (Simon, 1981, p.51). The organization achieves greater rationality by (1) dividing work among members in an efficient partitioning of activities; (2) establishing standard operating procedures that provide stability and reduce intergroup conflicts; (3) transmitting decisions downward; (4) providing channels of communication; and (5) training and inculcating values to its members (Simon, 1947, pp. 102-103). Organizations are structures of mutual expectation that reduce equivocality (Weick, 1979). Highly developed and precise language also may facilitate mutual expectations between various constituencies (March & Simon, 1958, p.3).

The behavioral theory of the firm views the organization as a coalition of various constituencies (Cyert & March, 1963). It suggests that an "organizational equilibrium" (Simon, 1982b) of stakeholders (shareholders, customers, employees (unions), managers) is possible if managers make decisions to integrate and mediate the interests of shareholders, employees, and customers (Aoki, 1984, 1988). This organizational equilibrium requires that an inducements-contributions balance is maintained among stakeholders.

Given that the employees choose not to exit, the authority relationship is then the property that gives formal organizations their important idiosyncratic characteristic (Commons, 1924, p.284). A superior-subordinate

relationship is regarded as "real" (Barnard, 1938, p. 170) and authority is exercised within a "zone of indifference" (Barnard, 1938, p.169) or a "zone of acceptance" (Simon, 1947, p.12) which provides the employer with a "liquid resource" (Simon, 1951) and flexibility¹. The worker-employer relationship frequently involves idiosyncratic tasks and hence, is not equivalent to the "grocer-customer" relationship (Alchian & Demsetz, 1972). The firm is fundamentally a hierarchical system (not a price system) and ultimately, "authority is viable to the extent that it is the focus of convergent expectations" (Arrow, 1974, p.72).

The picture of the firm that emerges from the behavioral theory is that of a searching, information processing, "satisficing", allocating institution (Leibenstein, 1966, 1987; Levinthal & March, 1981; March, 1988). A strategy is a set of programmed and nonprogrammed decision-making processes (Simon, 1982, p.276). These decisions are based on "disjointed incrementalism" (Braybrooke & Lindblom, 1963) or perhaps more optimistically "logical incrementalism" (Quinn, 1980). This decision-making has to be studied longitudinally as a process.

The strategy researchers who are perhaps most relevant to the behavioral model of the firm are those doing research on mental models, strategic maps, cognitive schemas and "dominant logics" (Huff, 1990; Prahalad & Bettis, 1986). Why do we need to study cognitive psychology in strategic management? Why shouldn't strategy be simply the "microeconomics of the short-run"? As is frequently the case, Simon (1959, p.255) put it best:

Suppose we were pouring some viscous liquid -- molasses -- into a bowl of very irregular shape. What would we need in order to make a theory of the form the molasses would take in the bowl? How much would we have to know about the properties of molasses to predict its behavior under the circumstances? If the bowl were held motionless, and if we wanted only to predict behavior in equilibrium, we would have to know little, about

molasses. The single essential assumption would be that the molasses, under the force of gravity, would minimize the height of its center of gravity. With this assumption, which would apply as well to any other liquid, and a complete knowledge of the environment -- in this case the shape of the bowl -- the equilibrium is completely determined. Just so, the equilibrium behavior of a perfectly adapting organism depends only on its goal and its environment; it is otherwise completely independent of the internal properties of the organism. If the bowl into which we were pouring the molasses were jiggled rapidly, or if we wanted to know about the behavior before equilibrium was reached, prediction would require much more information. It would require, in particular, more information about the properties of molasses: its viscosity, the rapidity with which it "adapted" itself to the containing vessel and moved toward its "goal" of lowering its center of gravity. Likewise, to predict the short-run behavior of an adaptive organism, or its behavior in a complex and rapidly changing environment, it is not enough to know its goals. We must know also a great deal about its internal structure and particularly its mechanisms of adaptation.

To paraphrase Simon (1978), strategy is the process and product (content) of thought. This process/content split is an absurd Cartesian dualism, which should be aggressively stormed by the young and the energetic in the strategy field.

Organizational economics researchers in strategy will have a predilection for adaptive feedback processes which are motivated, of course, by the consideration of bounded rationality (see a number of empirical articles in March, 1988). Simon notes that: "Every human organism lives in an environment that generates millions of bits of new information each second, but the bottleneck of the perceptual apparatus certainly does not admit more than 1,000 bits per second, and probably much less" (1959, p.273). This fact leads to two kinds of deviation from classical optimization: simplification of the model to make computation of an "optimum" feasible, or alternatively, searching for satisfactory rather than optimal choices. Simon (1982) regards both of these solutions as instances of satisficing behavior.

Simon (1976) makes the distinction between "substantive rationality" assumed in classical economic theory and the "procedural rationality" studied by psychologists. Substantive rationality denotes a style of behavior that is appropriate to the achievement of given goals, within the limits imposed by given conditions and constraints (Allison's (1971) rational actor). Procedural rationality is concerned with the perceptual and cognitive processes of learning and problem solving and the ways in which expectations are formed.

Understanding real world oligopolistic competition requires that we understand procedural rationality. Deductive game theoretic models of oligopoly have provided over 40 years worth of rigorous demonstrations of how fundamental the difficulties of substantive rationality really are. My challenge to doctoral students in strategy who see things differently is to go to the math department or the economics department and strive to become a world class game theorist. But for goodness sake don't submit another 2 person, 2 action, Nash equilibrium game for publication in a major strategy journal.

My own bets, however, are placed on those who pursue the research agenda of procedural rationality. One of the major premises of the behavioral approach is that strategic management, like chess strategy, is inevitably culture-bound and history bound. Simon (1976, p. 146) submits that:

Economics is one of the sciences of the artificial. It is a description and explanation of human institutions, whose theory is no more likely to remain invariant over time than the theory of bridge design. Decision processes, like all other aspects of economic institutions, exist inside human heads. They are subject to change with every change in what human beings know, and with every change in their means of calculation. For this reason the attempt to predict and prescribe human economic behavior by deductive inference from a small set of unchallengeable premises must fail and has failed.

Perhaps the best way to sum up the behavioral theorist's view of strategy is to use Bowman's (1990) felicitous phrase "strategy changes" (see also Schoemaker, 1990).

II. The Transaction Costs Theory of the Firm

While bounded rationality is a commonplace assumption in the strategy field, in general, the upper echelons of the economics profession look upon bounded rationality with a hostility that is normally reserved for greedy monopolists. There are exceptions to the rule. Williamson (1975, 1985) has been the most influential in keeping the very idea of bounded rationality alive within the discipline of economics.

Since the transaction cost approach that Williamson has championed is the most congenial economic approach for strategy researchers, I believe it has made an enormous impact on the strategic management field. Advances in transaction cost theory have been made at the conceptual (Alston & Gillespie, 1989; Jones & Hill, 1988; Williamson, 1971, 1989), modeling (Kleindorfer & Knieps, 1982; Riordan & Williamson, 1985; Wiggins, 1990), and empirical levels (Jones, 1987; Masten, Meehan, & Snyder, 1991). Its compelling logic and generative research qualities are undeniable for even its more vocal critics (Perrow, 1986).

Transaction cost theory is applicable to the study of vertical mergers (Crocker, 1983; Helfat & Teece, 1987; Hennart, 1988b; Klein, 1988; McManus, 1975; Perry, 1989; Riordan, 1990; Stuckey, 1983), vertical market restrictions (Katz, 1989; Marvel, 1982; Mathewson & Winter, 1985), hybrids (Blois, 1972, 1990; Borys & Jemison, 1989; Buttrick, 1952; Eccles, 1981; Jarillo, 1988, 1990; Phillips, 1960; Richardson, 1972; Shan, 1990; Thorelli, 1986) joint

ventures (Hennart 1988a; Kogut, 1988; Pisano, 1989), the employment relationship (Simon, 1951); the efficacy of capital markets (Williamson, 1970), corporate finance (Williamson, 1988b), oligopoly (Williamson, 1975), marketing (Anderson, 1988; Heide & John, 1988; John & Weitz, 1988), services (Bowen & Jones, 1986); organization theory (Leblebici, 1985; Williamson, 1990a), multinationals (Casson, 1987; Gatignon & Anderson, 1988; Hennart, 1982; Hill, Hwang & Kim, 1990; Teece, 1986; contract law (Macaulay, 1963; Macneil, 1978; Williamson, 1988a), political science (Moe, 1984), and business history (Atack, 1985; Chandler, 1977, 1990; Goldin, 1986; North, 1981, 1990). In short, transaction cost analysis is enjoying spectacular success. The theory has been influential in strategic management's formative years while it also has had a major influence in industrial economics (Tirole, 1988b) and microeconomic theory (Kreps, 1990b).

In some sense, Williamson's Markets and Hierarchies is a comparative assessment of complementary metaphors. The market or price system is considered through the information-processing lens of Hayek (1945), while the hierarchy (firm) is viewed by an alternative information-processing metaphor from Simon (1947). Breadth versus depth tradeoffs in knowledge by these alternative mechanisms are central to the theory. Also critical is the idea that human limitations for processing information are aggravated by strategic nondisclosure of information.

The advantages of the firm in a setting defined along these dimensions include: (1) the settlement of dispute by fiat (Dow, 1987), an advantage supported by the law governing employment transactions (Clark, 1984; Masten, 1988); (2) the fact that information is processed in an adaptive sequential manner; (3) the likelihood that convergent expectations and coordination are

achieved (Malmgren, 1961); (4) the use of internal audits to reduce asymmetric information (Williamson, 1975) also supported by the law (Clark, 1985; Masten, 1988); (5) the availability of information to allocate personnel to tasks more effectively (Levy & Haber, 1986); (6) respect for equity and due process (Doeringer & Piore, 1971); and (7) communication effectiveness increased by shared idiosyncratic language (an advantage that any good academic will appreciate). In short, transaction cost theory then suggests that the firm is preferred to the market due to the firm's incentive, adaptability, monitoring, dispute settling, and reward refining attributes.

Limitations of the firm include diminishing returns to management (Boulding, 1966); control loss (Williamson, 1967); the increasing costs of extending incentive contracts as span increases (Rasmusen & Zenger, 1990); internal procurement bias, including reciprocity (Gouldner, 1960); internal expansion bias (Williamson, 1975); and program persistence bias due to psychological "sunk costs" (March & Simon, 1958, p.173); and psychological commitments to a course of action (Duhaime & Schwenk, 1985). An organization is prone to politicizing as well as "influence activities" (Milgrom, 1988; Milgrom & Roberts, 1990). The firm may also misutilize assets and manipulate accounting data (Williamson, 1985). While the "market failure" literature is robust (Dundas & Richardson, 1980; Wolf, 1979; Yao, 1988), the organizational economics approach is in need of further development of "bureaucratic failure" (Downs, 1967; Granovetter, 1985, 1990).

The transaction cost approach maintains an orthodox economizing orientation but replaces the neoclassical production function approach with a governance structure orientation. The transaction is the basic unit of analysis (Commons, 1924). The behavioral assumptions of this approach are

bounded rationality and opportunism on the part of some individuals (Hill, 1990) which have important ramifications for explaining and predicting "efficient boundaries" (Ouchi, 1980). Opportunistic behavior may take many forms and manifestations including the possibility that some people may attempt to embezzle funds and some may rob banks². More academic categories include:

- 1) ex ante adverse selection (hidden information) such as Akerlof's (1970) market for lemons. Over time the low quality autos (the lemons) will more likely be brought to the market than the high quality autos because the owners of the high quality autos will not be able to receive the true value of the auto.
- 2) ex post moral hazard (hidden action) such as cheating on a contract or shirking in the employment relationship; and
- 3) ex post hold-up which allows the appropriation of quasi-rents in idiosyncratic exchange. The contractual problems between Fisher Body and General Motors are illustrative (Klein, Crawford & Alchian, 1978).

The logic of transaction cost theory is that "institutions of capitalism" (Williamson, 1985) emerge to solve problems of opportunism. For example, in the used car market (for lemons), partial warranties have emerged to attenuate the adverse selection problem (Akerlof, 1970). Without these warranties, the buyer would be foolish to pay anything approaching the book value of the car. Similarly, anticipation of expropriability of quasi-rents will motivate pre-investment protective contractual arrangements (Alchian, 1984; Alchian & Woodward, 1987, 1988). For example, collateral may be used to protect contractual parties. In the current institutional setting in the United States we have devised formal contracts, guarantees, brand names, and effective monitoring mechanisms to control opportunism (North, 1990). In short, we have well-specified and well-enforced property rights (Barzel, 1989).

The core argument of transaction costs is compactly expressed as follows: The governance structures that we observe in our "institutions of capitalism" are devised to economize on bounded rationality and to simultaneously safeguard transactions against opportunism of adverse selection, moral hazard and hold-ups. Cost reducing governance structures emerge from institutional competition.

Institutional arrangements are not without cost. Ex ante transaction costs include the costs of discovering the existence of potential buyers (sellers); acquiring information; negotiating; drafting an agreement; safeguarding and bonding arrangements (Coase, 1937, 1972; Williamson, 1985). Ex post transaction costs include haggling; adaptation; monitoring; enforcement; termination; and the residual loss of cheating and shirking. The logical objective posited is that of minimizing the sum of transaction costs and production costs (Williamson, 1985).

Cost minimization is a complex multidimensional problem. There are two important interdependencies that must be considered: (1) Ex ante and ex post transaction costs are interdependent. For example, more expenditures to consider contingencies in a contract and to impose penalties for breach ex ante, may potentially lower ex post contractual opportunism and transaction costs. (2) Production costs and transaction costs are interdependent. For example, an idiosyncratic asset may provide lower production costs than a general purpose (non-specific) technology but the problem of "hold-up" may lead to higher transaction costs. Tradeoffs among costs therefore must be recognized. In choosing among discrete organization structural alternatives, the differential efficiency of alternative modes is assessed.

The environmental conditions that make transaction cost analysis critical are asset specificity, uncertainty, and frequency (Williamson, 1979). The major dimensions of asset specificity are site, physical and human capital specificity. As site specificity increases, the buyer and seller become locked-in to a relationship so as to economize on inventory and transportation costs. Physical asset specificity occurs when one or both parties to a transaction make investments in plant and equipment that involve design characteristics specific to the transaction. Human capital specificity involves learning by doing and team experience (Mortensen, 1978; Nelson & Winter, 1982). Several empirical papers indicate that higher asset specificity may necessitate internal procurement (Anderson & Schmittlein, 1984; Caves & Bradburd, 1988; Davidson & McFetridge, 1984; Joskow, 1985; Krickx, 1990; Levy, 1984, 1985; Masten, 1984; Masten, Meehan & Snyder, 1989; Monteverde & Teece, 1982; Spiller, 1985; Walker & Poppo, 1991).

Uncertainty in this context may take many forms. Here, we consider two types of uncertainty, volume and technological. Uncertainty and asset specificity are interactive variables influencing organizational form. Volume uncertainty will lead to greater internalization of production when asset specificity is high (Walker & Weber, 1984). However, volume uncertainty may lead to a lower adoption of firm-specific technologies and hence internalization will be lower (Harrigan, 1984, Williamson, 1985).

In terms of technological uncertainty, if the technological uncertainty is due to the uncertain timing of the obsolescence of a technology, less internalization is predicted (Balakrishnan & Wernerfelt, 1986). On the other hand, if the technological uncertainty is due to the complexity of

coordinating a technical system, greater internalization is predicted (Armour & Teece, 1980).

It is not clear how frequency affects the make or buy decision. Repetition makes it easier to sustain a self-enforcing contractual agreement (Telser, 1981). On the other hand, increased frequency of transactions makes internal procurement more feasible (Williamson, 1979).

As a general theorem (Coase, 1937; Williamson, 1975), in the absence of transaction costs, vertical restrictions may replicate the vertical financial ownership outcome (i.e., internal transfers within the boundary of the firm). Put differently, in the absence of transaction costs, the choice of governance structure does not matter. In more applied terms, the choice of vertical financial ownership (by internal development or merger & acquisition) and vertical contracts leads to equivalent efficiency results. Table 3 illustrates the isomorphic nature of vertical financial ownership and various forms of vertical contracts (Mahoney, 1989, 1991).

Insert Table 3 about here

In the real world of positive transaction costs, interfirm differences in contracting choice have an impact on firm performance (Masten, Meehan & Snyder, 1991; Mosakowski, 1991). The manufacturer-retailer relationship involves "bilateral moral hazard problems" (Tirole, 1988b). A problem for the manufacturer is to induce the retailer to provide the correct amount of effort and services. A problem for the retailer is to induce the manufacturer to provide advertisement, and maintain product quality and brand name reputation.

Vertical contracts may be motivated either by efficiency (Telser, 1960) or market power (Comanor & Frech, 1985). Theoretically, the only defensible position on vertical restraints seems to be a rule of reason (Phillips & Mahoney, 1985). "Per se rules" prohibiting certain vertical contracts reduce the firm's choice set. However, in practice it may be difficult to implement the rule of reason to determine whether a vertical contract is meant to foreclose a market or to promote efficient investment (Tirole, 1990).

III. The Property Rights Theory of the Firm

A theory related to the transaction cost theory is the property rights theory of the firm. Indeed, two of the most important figures in transaction costs have provided seminal works in the property rights tradition (Coase, 1960; Commons, 1924). In the property rights approach, the corporation is viewed as a "method of property tenure" (Berle & Means, 1932, p. 1).

The three criteria for efficiency of property rights are: (1) universality -- all scarce resources are owned by someone; (2) exclusivity -- property rights are exclusive rights; and (3) transferability -- to ensure that resources can be allocated from low to high yield uses. In the neoclassical model all three criteria are in place (De Alessi, 1980, 1983). The cost of information is zero; private property rights are fully defined and enforced at zero costs; and the state upholds the institutions of market exchange. However, in the real world of positive measurement (transaction) costs (Barzel, 1989) some rights are not fully delineated (e.g., common rights in some fisheries); some rights are not fully enforced (e.g., thefts are not reduced to zero); some rights are not priced (e.g., parking space in some

shopping centers); and some rights are not transferable (e.g., the inalienable right to liberty and hence the illegality of slavery). In the absence of any rights to exclude individuals from the use of a particular resource, the income from the resource will be dissipated (Cheung, 1970; Hardin, 1968).

Property rights are human rights, the rights possessed by individuals or groups of individuals (Furubotn & Pejovich, 1972, 1974). Their use involves domain partitioning (Alchian, 1965, 1969). When a firm buys a machine, for example, it is paying for the right to obtain the services and output of the machine and the associated right to do what they like with the output, including selling it. When Ted Turner purchases the movie "Gone with the Wind" does he have the right to colorize it? It depends, of course, on the use-domain partition. Ownership entails not the property per se, but rather the property rights. Thus, from the property rights perspective, the factors of production that a firm "owns" are not the physical resources but rather are the property rights (Coase, 1960).

Alchian and Demsetz (1972) define the "classical capitalist firm" in property rights terms as: (1) the right to appropriate returns from an asset (in team labor production the right to receive the residual); (2) the right to use and change the form of the asset (in the case of labor the right to terminate or revise membership); and (3) the right to transfer the above mentioned rights (alienability). The property rights of the classical firm are obviously a function of the particular circumstance of time and place and are influenced by, among other things, social norms (I tend to think of norms influencing property rights but see Jones (1983) on how property rights influence culture and norms). The competitive process involves the transfer

of (attenuated) property rights between the owners of resources, commodities, and labor services (Eggertsson, 1990).

Alchian and Demsetz (1972) argue that the structure of property rights have a significant impact on agency and transaction costs and establish a context within which transactions are negotiated. Indeed, transaction cost theory, property rights theory and positive agency theory are intertwined. Alchian and Demsetz (1972) argue that the manager has rights as residual claimant and therefore the incentive to monitor workers. Workers have a Hobbesian incentive (Bowles, 1985) to be monitored to minimize shirking in team production (Jones, 1984). Cheung (1983, p.8) provides a dramatic example to illustrate this point:

My own favorite example is riverboat pulling in China before the communist regime, when a large group of workers marched along the shore towing a good-sized boat. The unique interest of the example is that the collaborators actually agreed to the hiring of a monitor to whip them.

Grossman and Hart (1986), and Hart (1988) provide a sophisticated property rights theory of the firm. The firm is viewed as an incomplete contract with residual rights. Grossman and Hart (1986) view asset ownership as control over residual rights. Each asset has a single owner and that owner has the right to control the asset in the case of a missing (contractual) provision. Differences between market organization and the firm (vertical integration) are entirely attributed to the asset ownership differences that distinguish them. Their model highlights the fact that ownership matters when ex post bargaining costs are prohibitively costly or infeasible.

Only in the mythical world of zero transaction costs would resources find their highest valued use no matter how property rights and liabilities are assigned (Coase, 1960) --- the so-called "Coase theorem". In such a world

there are no problems of social costs from ownership, technical or public good externalities (Bator, 1958). Coase's main point was that in the real world, property rights do matter due to positive transaction costs (Calabresi, 1968; Knight, 1924). Externalities may be internalized either by contract (Cheung, 1973; Coase, 1974) or by the firm (Coase, 1937, 1988a) and this choice will have cost effects. The significance of the study of property rights results from the fact that positive transaction costs are present. Ownership and decision-making rights are important choice variables (Barzel, 1989; Dahlman, 1979, 1980).

Indeed, there is an isomorphism between the Coase theorem (Coase, 1960) that in the absence of agency and transaction costs, liability rules (property rights) do not matter and the idea expressed in the previous section that in the absence of transaction costs, organizational form (governance structure) does not matter (Coase, 1937, Mahoney 1991). Coase (1988b, p. 34) observed that:

Transaction costs were used in the one case to show that if they are not included in the analysis, the firm has no purpose, while in the other, I showed, as I thought, that if transaction costs were not introduced into the analysis, for the range of problems considered, the law had no purpose.

In the real world of positive agency and transaction costs, when will property rights emerge? Demsetz (1967) argues that the emergence of new property rights "takes place in response to the desires of the interacting persons for adjustments to new benefit-cost possibilities" (p. 350) that may result from technological change and the opening of new markets or changes in relative factor scarcities. Case studies have supported Demsetz' view (Hallagan, 1978; Libecap, 1978; Umbeck, 1981). Property rights are

endogenously determined. Evolutionary pressures of litigants influence the efficiency of the common law (Rubin, 1983).

Clearly rent-seeking (Krueger, 1974) induces change in property rights. Establishing and producing property rights is very much a productive activity toward which resources can be devoted. As Davis and North (1971, p.39) suggest: "It is the possibility of profits that cannot be captured within the existing arrangemental structure that leads to the formation of new (or the mutation of old) institutional arrangements". Both the legal environment and the political and regulatory environment are arenas for institutional change of the "rules of the game" (Lindblom, 1977). Institutional change is a historical and path dependent process (North, 1990) and, of course, might makes rights (Umbeck, 1981).

Property rights are more likely to change (Libecap, 1989, p.28):

- 1: The greater the size of the anticipated aggregate benefits of institutional change;
- 2: The smaller the number and/or the lower the heterogeneity of the cooperating interest groups;
- 3: The lower the information asymmetries among competing parties; and
- 4: The lower the concentration of wealth under the proposed property rights allocation, and thus the lower the likelihood of political opposition.

Libecap (1986, 1989) provides case studies of mineral rights, federal land policy, contracting in fisheries and contracting for the unitization of oil fields (where production rights are delegated through negotiation to a single firm) to illustrate these fundamental propositions. For example, in the case of oil field unitization, despite the potential for significant gains,

unitization arrangements were not widespread, due to distributional conflicts and heterogenous firms with asymmetric information which increased bargaining costs (Libecap & Wiggins, 1984; Wiggins & Libecap, 1985).

Van de Ven (1989) reminds us that "nothing is quite so practical as a good theory". I submit that there is "nothing so theoretical as a good practice". A study of contracts can provide data about the way in which businessmen and lawyers provide answers to problems that strategic management researchers find intractable. The following articles illustrate that much can be learned from the study of contracts: Crocker & Masten, 1988; Goldberg & Erickson, 1987; Joskow, 1977, 1987, 1988; Libecap & Wiggins, 1985; Masten & Crocker, 1985; Mulherin, 1986; Palay, 1984, 1985.

IV. The Agency Theory of the Firm

Williamson (1988b) suggests that there are several commonalities between transaction costs and positive agency theory (Jensen & Meckling, 1976). Both theories assume bounded rationality and opportunism (moral hazard). The consequences of bounded rationality and opportunism in both theories is incomplete contracting and contractual hazards. Both theories are expressly concerned with efficient contracting. Agency theory emphasizes ex ante alignments of incentives, while transaction cost theory emphasizes ex post governance issues (dispute resolution and maladaptation costs) (Mahoney, 1991).

Agency theory offers a flexible and generalizable paradigm for a host of strategic problems. The theory offers challenges to researchers at the conceptual, mathematical and empirical level. At the conceptual level agency

theory may be viewed as the economic "response to the questions raised many years earlier by March and Simon (1958) regarding the behavior of an organization of self-interested agents with conflicting goals in a world of incomplete information" (Levinthal, 1988, p. 154). Applications are ubiquitous and include such areas as insurance, regulatory policy, diversification strategy, compensation policy, board relationships, and innovation. The theory can consider several agents, several principals and multilevel structures (Tirole, 1986) and dynamics which addresses incentive problems of both adverse selection and moral hazard (Tirole, 1988a).

There are two branches to agency theory (Eisenhardt, 1989; Jensen, 1983). The mathematical principal-agent model (Holmstrom, 1979) and positive agency theory (Fama & Jensen, 1983a, Jensen & Meckling, 1976). The principal-agent model attempts to derive an optimal contract when outcomes are a function of effort and an exogenous random factor whose probability distribution is assumed to be known. The standard agency model assumes: (1) self-interested principal(s) and agent(s); (2) divergent goal(s) between principal(s) and agent(s); (3) information impactedness (Williamson, 1985); (4) imperfect ex post settling up (Fama, 1980); (5) stochastic outcomes; and (6) problems of risk sharing (Eisenhardt, 1988; Holmstrom & Tirole, 1989).

I submit that the mathematical principal-agent model does not fit very well in the organizational economics approach that has been suggested in this paper. The basic point is that the mathematical principal-agent model does not come to grips with the problem of bounded rationality. Principal-agent models align ex ante incentives to a superlative degree. The research is an offspring of the contingent claims contracting of Arrow and Debreu, but extends that literature by considering the possibility of asymmetric

information. Contingent claims contracting in the real world is the stuff that dreams are made of. As Simon notes: "The dream of thinking everything out before we act, of making certain we have all facts and know all the consequences, is a sick Hamlet's dream" (1982b, p.180).

A major motivation of Williamson's (1975) transaction cost approach was to move beyond the mythical world of contingent claims contracting. The unrestricted cognitive competence exhibited by actors in contingent claims contracting and in the principal-agent model assumes away the major problem of organizational science: How do we manage and organize governance structures in a world of bounded rationality? The principal-agent model leaves out: ownership and property rights (Grossman & Hart, 1986); power (Pfeffer & Salancik, 1978); bureaucratic politics (Allison, 1971); the authority relationship and bounded rationality (Simon, 1947).

The principal-agent model also does not fit with the property rights theory of the firm (Grossman & Hart, 1986). In fact, the premise of transaction costs and property rights theory is that self-enforcing principal-agent contracts are prohibitively costly to devise and implement. In contrast to the property rights theory, in the principal-agent model there are no residual rights at all! The whole point of the principal-agent model is to get all the obligations defined at the outset (with due provisions for asymmetric information). If agents commit to a multi-period contract then the future holds no surprises. There are no emergent strategies in the principal-agent world. All the action takes place ex ante and all of eternity takes place in a nano-second.

To rephrase my argument, the whole point of organizational economics for the purposes of strategic management is to move beyond the mythical world of

the principal-agent model. The problems that lead to the infeasibility of contingent claims contracting apply equally well to principal-agent contracts. The economics profession has, by and large, been pushing transaction costs in the direction of substantive rationality. In fact the combined neoclassical/institutional economics has been referred to by some as neoinstitutional economics (Eggertsson, 1990). Work by Kreps (1990b), Riordan & Williamson (1985), and Tirole (1988b) among others, have made impressive progress in this regard. As Kreps (1990b, p.757) notes, mathematical models of transaction cost economics are in effect pushing the theory of transaction cost economics into the domain of individuals who are unboundedly rational and opportunistic.

My own strong view is that strategic management should push the organizational economics approach in the direction of procedural rationality. The outcome will be a conversation that is unique to strategy research and will at the same time be complementary to the deductive economic approach. Process research that combines organizational economics, behavioral economics and human problem solving is a large niche in the academic space that strategic management may fill.

Principal-agent models may be valued on their own terms and for the purposes of their own objectives but I would emphatically argue that principal-agents models are not potential candidates for a theory of the firm in organizational economics. Principal-agent theory does not (and never claimed to) provide an answer to the question of "efficient boundaries" (Ouchi, 1980). Principal-agent theory contributes to the conversation on optimal incentive schemes. It is not about organizational form; it provides no predictions concerning the nature and extent of the firm (Hart, 1989).

Not only does the principal-agent model not fit with the behavioral theory, the transaction costs theory or the property rights theory of the firm, I would argue that the principal-agent model does not fit with positive agency theory. Indeed, the fact that conversation between positive agency theory and principal-agent theories is sparse (Jensen, 1983) is hardly a puzzle. I regard positive agency theory (along with the other five organizational economics theories) as an evolutionary, bounded rationality theory.

In the positive agency theory literature, agency costs are made up of (1) monitoring expenditures made by the principal to regulate and monitor the behavior of the agent; (2) bonding expenditures made by the agent to reassure principals; and (3) residual agency costs (Jensen & Meckling, 1976). The firm is viewed as a legal fiction that serves as a nexus of contracts among various factors of production³.

The positive agency theory literature is complementary to the transaction cost literature. While the transaction cost literature has not paid sufficient attention to information asymmetries and differences between agents in the costs of bearing risks, agency theory relies on assumptions about information asymmetries and risk aversion, but ignores transaction-specific investments (Mahoney, 1991).

In the positive theory of agency, "capital intensity, degree of specialization of assets, information costs, capital markets, and internal and external labor markets are examples of factors in the contracting environment that interact with the costs of various monitoring and bonding practices to determine contractual forms" (Jensen, 1983, pp. 334-335). A three part taxonomy is used to characterize the organization: (1) performance measurement

and evaluation systems (observing input; measuring output); (2) reward and punishment systems (e.g., profit sharing; termination clauses); and (3) systems for partitioning and assigning decision rights among participants in the organization (Jensen, 1983)⁴.

A fourth possibility is that the organization's task is to minimize the divergence of preferences of team members via selection, training, and socialization (Eisenhardt, 1985; Ouchi, 1979) and to develop a clan relationship (Ouchi, 1980). A clan is needed most when output measurement is difficult due to the difficulty of determining output quality (Barzel, 1982) and/or the possibility of free-riding in team production -- the so-called "nonseparabilities" problem (Alchian & Demsetz, 1972) when combined with problems of internal measurement due to low task programmability (Eisenhardt, 1985).

A fundamental insight from the agency literature is that both the principal and the agent have a parallel incentive to reduce the divergence between optimal and actual performance by selecting an appropriate mix of monitoring and bonding arrangements. If monitoring is costly, then bonding arrangements such as liquidated damage provisions and termination clauses will obtain. Transactors willingly subject themselves to constraints to reduce agency costs (Jensen & Meckling, 1976; Schelling, 1960).

The literature on franchising where the franchiser offers the franchisee a premium-termination clause bundle is illustrative (Klein, 1980; Klein & Murphy, 1988). These interactive ex ante provisions may reduce ex post monitoring costs. The termination clause is particularly effective when the franchisee is forced to increase its sunk costs ex ante by making franchise-specific investments (a hostage; Klein & Leffler, 1981). In fact, such sunk

cost investments may allow the franchiser to lower its premium paid to the franchisee. In addition to minimizing ex post agency costs, franchise-specific investments provide a self-selection mechanism such that the franchiser will attract the more capable entrepreneurs. Credible commitments may support self-enforcing exchange (Williamson, 1983). The several standard clauses of the franchise contract may be viewed as a set of cross-enforcing provisions that minimize transaction costs (Caves & Murphy, 1976; Klein & Saft, 1985; Martin, 1988; Norton, 1988; Rubin, 1978). I also submit that the large literature on sharecropping (Alston, Datta, & Nugent, 1984; Cheung, 1969; Datta & Nugent, 1989) and the literature on franchising are isomorphic.

A second fundamental insight from the literature is that while specialization and the division of labor have had important productivity consequences (Smith, 1776; North, 1990), specialization is a double-edged sword. Specialization also creates asymmetric information problems, which of course ties closely to the source of agency difficulties (Hart & Holmstrom, 1987).

An exemplar in the positive agency literature is the problem of the separation of ownership and control. Berle and Means (1932, p.121) inquired whether there was "any justification for assuming that those in control of the modern corporation will also choose to operate it in the interests of the owners?" The premise is that the proper role of managers is to maximize shareholder wealth and the problem is to align incentives such that managers act as a surrogate for shareholders. The positive agency literature has provided several mechanisms which have evolved to attenuate the agency problem:

- (1) The market for corporate control (Jensen & Ruback, 1983; Manne, 1965);

- (2) A capital market governed by rational expectations (Jensen & Meckling, 1976);
- (3) The market for managers. Internal labor markets give managers an incentive to be efficient (Fama & Jensen, 1983b) and external labor markets provide an additional "ex post settling up mechanism" (Fama, 1980);
- (4) The outside hiring of managers (Faith, Higgins & Tollison, 1984);
- (5) The use of outside directors (Baysinger & Butler, 1985; Baysinger & Hoskisson, 1990; Fama, 1980);
- (6) Delayed compensation such as profit-sharing arrangements and stock options which provide means of "bonding" managers to the firm and thus induce managers to perform in the long-run interests of firm profitability. Complex compensation packages consisting of salary, performance bonuses, stock ownership, and pension plans typically are utilized to bring management's interests in line with those of stockholder's (Brickley, Bhagat, & Lease, 1985; Coughlan & Schmidt, 1985; Eaton & Rosen, 1983; Jensen & Meckling, 1976; Knoeber, 1986; McWilliams, 1990);
- (7) Monitoring by institutional investors which reduces asymmetric information between investors and firm's managers (Brickley, Lease & Smith, 1988; Graves & Waddock, 1990; Oviatt, 1988);
- (8) The multidivisional organizational form which serves as a miniature capital market. This structure can achieve an efficient allocation of capital and lessen the problems of asymmetric information and bounded rationality by providing a nearly decomposable or decoupled system (Chandler, 1962; Hoskisson & Turk, 1990; Mahoney, 1992b; Orton & Weick, 1990; Simon, 1962; Williamson, 1975).
- (9) concentrated ownership (although the relationship is probably not monotonic) (Hill & Snell, 1989; Morck, Shleifer & Vishny, 1988);
- (10) competitive forces in the product market (Alchian, 1950; Williamson, 1964); and
- (11) corporate culture (Barney, 1986a).

Strategy researchers might make a key advance in the literature if they were to flesh out the ways in which these mechanisms are linked (Walsh &

Seward, 1990). For example, the market for corporate control and the development of the multidivisional form are complementary and self-reinforcing (Williamson, 1975). On the other hand, while a strong takeover market may mitigate the problem of managerial shirking (low effort), it may create the agency problem of managerial myopia (Jensen & Meckling, 1979) and low risk exposure (Amihud & Lev, 1981).

Organizational economics recognizes that the discretion of managers is attenuated, but is hardly eliminated, by the "institutions of capitalism". Indeed, managerial entrenchment (Amihud & Lev, 1981) appears to be alive and well and takes many forms: dual class recapitalization (Jarrell & Poulsen, 1988); greenmail (Bradley & Wakeman, 1983; Dann & DeAngelo, 1983; Kosnik, 1990); poison pills (Malatesta & Walkling, 1988; Ryngaert, 1988); supermajority amendments (DeAngelo & Rice, 1983; Jarrell & Poulsen, 1987; Mahoney & Mahoney, 1991); and reduction in cumulative voting rights (Bhagat & Brickley, 1984) among others.

A second exemplar problem in the agency literature concerns the firm's capital structure in corporate finance. The famous Modigliani-Miller (1958) capital structure irrelevance proposition is that the value of the firm in a frictionless and tax-free perfect capital market is independent of the mix of debt and equity. The average cost of capital is completely independent of its capital structure.

The Modigliani-Miller theorem is a special case of the Coase theorem that we considered in the property rights section. Recall that Coase (1960) argued that in the absence of agency and transaction costs, the assignment of property rights (liability rules) does not matter. Modigliani & Miller (1958) argue that with rational behavior (i.e., we like more money rather than

less; and we do not exhibit systematic biases) and perfect capital markets, capital structure does not matter. The zero agency and transaction cost assumption of Coase (1960) is captured by Modigliani & Miller (1958) in their "perfect capital market" assumption which must satisfy five conditions: (1) competitive markets for securities; (2) costless access to relevant information (i.e., no agency costs); (3) no transaction costs in buying and selling securities; (4) no taxes (a type of transaction cost as Coase, 1937 noted); and (5) no incentive distortions in managerial investment decisions (i.e., no agency costs).

To rephrase the Modigliani-Miller theorem in Coase's terms: In the absence of agency and transaction costs, capital structure does not matter. This ties the property rights theory of Coase (1960) nicely to agency theory and corporate finance but let's not be satisfied stopping here. We can also tie in the transaction cost theory by noting the isomorphism between the Modigliani-Miller theorem that in the absence of agency and transaction costs, capital structure does not matter and the transaction cost argument that in the absence of agency and transaction costs, governance structure does not matter (Coase, 1937, Williamson, 1979).

Williamson (1988b) notes the parallels between the make-or-buy decision and the equity ("make")-or-debt ("buy") decision. Both decisions may be critical in a world of positive agency and transaction costs. The agency literature provides several models of positive agency costs in which capital structure does matter:

- (1) positive taxes and bankruptcy costs;
- (2) models of asymmetric information in which debt is a signal that a firm has a favorable return distribution (Ross, 1977);

- (3) models of resource constraints in which total equity would dilute an entrepreneur's incentives and total debt would result in risk distortion since the owner-manager would have a strong incentive to engage in activities that are likely to yield very high returns with low probability of success, and thus, an optimal capital structure will minimize the sum of these two agency problems (Jensen & Meckling, 1976); and
- (4) since managers may not always be assumed to be acting in the shareholder's interests, debt can align the incentives of the manager with the shareholder. Debt financing acts as a bond which the manager posts to assure equity holders that their funds will not be completely misappropriated (Grossman & Hart, 1982).

Isomorphic to papers demonstrating that corporate structure matters, are papers in the transaction cost literature demonstrating that governance structure matters (Williamson 1975, 1985). As we saw in the section on transaction costs, high asset specificity (nonredeployable assets) is predicted to lead to a "make" decision over a "buy" decision. Williamson (1988b) argues that when a firm possesses nonredeployable (sunk cost) assets, internal financing (retained earnings; "make") is more likely than external debt financing ("buy"). Debt is untenable for nonredeployable assets since the preemptive claims of the bondholders against the firm-specific investments afford limited protection.

Table 4 below summarizes these points. At a general level, the upshot of my argument is this: transaction cost theory, property rights theory and positive agency theory are not only commensurable they are isomorphic.

Insert Table 4 about here

V. A Resource-based Theory of the Firm

The resource-based theory of the firm is intimately tied to all four previous theories of the firm. The resource-based theory is linked to the behavioral theory of the firm, if superior heuristics lead to higher rents (Schoemaker, 1990). The resource-based theory is linked to transaction costs because resource combinations are influenced by transaction cost considerations (Teece, 1982). The resource-based theory is linked to property rights since delineated property rights make resources valuable and as resources become more valuable, property rights become more precise (Libecap, 1989). Finally, the resource-based view is linked to agency theory as Castanias & Helfat (1991) explain in their recent article in a special issue on the resource-based theory because the resource deployment of the firm is influenced by agency costs.

In the resource-based theory of the firm, strategy is viewed as a continuing "search for rent" (Bowman, 1974, p.74), where rent is defined as return in excess of a resource owner's opportunity costs (Ricardo, 1817; Tollison, 1982). A resource may be classified under a few headings: land and equipment, labor including worker's capabilities and knowledge, and capital (organizational, tangible and intangible) -- but the sub-division of resources may proceed as far as is useful for the problem at hand (Penrose, 1959, p.74).

The firm is considered both an administrative organization and a pool of productive (interdependent) resources (Caves, 1980, 1984; Penrose, 1959, p. 31). Productive idiosyncratic resources may take the form of human capital (Becker, 1964), physical capital (Klein, Crawford & Alchian, 1978), legal capital (Alchian, 1982; Barzel, 1989) and intangible capital (Caves, 1982).

These resources supply the genetics of firm heterogeneity. The heterogeneity of resources suggest the uniqueness of a firm (Penrose, 1959, p.199) and a source of sustained competitive advantage (Ghemawat, 1986).

Rents derived from resources which are simultaneously superior, imperfectly imitable (Lippman & Rumelt, 1982), and non-substitutable, will not be dissipated by competition if they are nontradeable or traded in imperfect factor-markets (Barney 1986b, 1988, 1991; Dierickx & Cool, 1989; Peteraf, 1990). A firm may achieve rents not because it has better resources, but rather it makes better use of its resources (Penrose, 1959, p.54). The firm may make better use of human capital by assigning workers correctly to where they have higher productivity in the organization (Prescott & Visscher, 1980; Tomer, 1987), and the firm may make better allocation of financial capital toward high yield uses (Williamson, 1975). Top management resources may be an important source of rent generation (Castanias & Helfat, 1991; Prahalad & Hamel, 1990).

The links between the "resources approach" (Penrose, 1959, p.217) to the firm and the mental maps (Huff, 1990) or "dominant logic" (Grant, 1988; Prahalad & Bettis, 1986) of managers has yet to be worked out. To be sure, there is a rich connection between the firm's resources, distinctive competencies and the mental models (dominant logics) of the managerial team which drives the diversification process (Ginsberg, 1990). Penrose long ago argued that resources "shape the scope and direction of the search for knowledge" (1959, p.77).

The services and rents that resources will yield depend upon the dominant logic of the top management team, but the development of the dominant logic of the top managerial team is partly shaped by the resources they deal with.

Expansion of the firm is related to the firm's resources, experience, knowledge and also opportunities in the environment. The notion that the firm's current resources influence managerial perceptions and hence the direction of growth is a behavioral proposition that reinforces the economic rationale that a firm's resource profile will influence diversification decisions (Wernerfelt, 1984, 1989).

Management is a scarce resource (Demsetz, 1988, p. 144). In Penrose's (1959) theory "management (is) both the accelerator and the brake for the growth process" (Starbuck, 1965, p.490). Penrose (1959) suggests that there is a managerial constraint on the growth rate of the firm, the so-called "Penrose effect" (Marris, 1963), which suggests a negative correlation between growth rates in successive periods. Case studies (Richardson, 1964), formal models (Slater, 1980; Uzawa, 1969) and econometric tests (Shen, 1970) provide support for the Penrose effect.

Penrose (1959) suggests that unused and productive services from existing resources present a "jig-saw puzzle" for balancing processes (1959, p.70). The firms distinctive competencies and capabilities (Andrews, 1971; Ansoff, 1965) lie upstream from the end-product -- it resides in human resources (Griesinger, 1990), skills, capacities, and inputs which find a variety of end uses (Teece, 1982). Penrose (1959, p.73) suggests a "virtuous circle" in which the process of growth necessitates specialization but specialization necessitates growth and diversification to fully utilize unused productive services. Thus, specialization induces diversification (see also Gort, 1962). An optimal growth of the firm involves a balance between exploitation of existing resources and the development of new resources (Penrose, 1959; Rubin, 1973; Wernerfelt, 1984).

In terms of the direction of diversification, the resource-based theory contributes to the strategy conversation on diversification (Ramanujam & Varadarajan, 1989; Rumelt, 1974) by positing that the direction of growth is determined by resource profiles (Lemelin, 1982; MacDonald, 1985; Montgomery & Hariharan, 1991; Stewart, Harris & Carleton, 1984) and that the rate and direction of diversification have important firm effects.

While Schmalensee (1985) does not find support for the existence of firm effects, several other empirical papers find significant firm effects (Duhaime & Stimpert, 1991; Hansen & Wernerfelt, 1989; Jacobsen, 1988; Rumelt, 1991). Professors Montgomery and Wernerfelt display a compatible mating of their respective work, submitting that the resource-based theory of the firm provides a theoretical underpinning for explaining and predicting significant firm effects (Montgomery & Wernerfelt, 1988; Wernerfelt & Montgomery, 1988; see also Chatterjee, 1990a, 1990b; Chatterjee & Wernerfelt, 1991). A focus on specific resources rather than strategy types in the merger & acquisition research may better explain firm performance (Harrison, Hitt, Hoskisson, & Ireland, 1991).

While, in general, the organizational economics/evolutionary approach is concerned with the origin, function, evolution, and sustainability of our "institutions of capitalism" the resource-based view is expressly interested in the origin, function, evolution and sustainability of the rent-generating heterogenous firm. The key to the sustainability of rents at the firm level is the existence of isolating mechanisms (Rumelt, 1984, 1987). The notion of an isolating mechanism (at the firm level of analysis) is an analogue of entry barriers (at the industry level; see Scherer & Ross, 1990 for the empirical

literature) and mobility barriers at the strategic group level (Caves & Porter, 1977; McGee & Thomas, 1986).

Absent government intervention, isolating mechanisms exist because of asset specificity and bounded rationality (Williamson, 1979). Or, put differently, isolating mechanisms are the result of the rich connections between uniqueness and causal ambiguity (Lippman & Rumelt, 1982). A careful examination of "barriers to imitation" listed in Table 5 below reveals the powerful generalizable insights of these two seminal articles (Mahoney & Pandian, 1991).

Insert Table 5 about here

The resource-based theory may also be connected to strategic group and industry analysis. Albeit at different units of analysis, strategic group research is by no means inconsistent with the resource-based theory. In fact, as McGee & Thomas have noted: "strategic group analysis has interesting parallels with the theory of the growth of the firm as first articulated by Downie, Penrose and Marris more than 20 years ago" (1986, p.157).

There is some common ground between the "two systems of belief" (Demsetz, 1974) in industrial organization and the resource-based approach. The resource-based view is closer to the "Harvard school" Mason-Bain-Porter framework in believing in the effectiveness of these isolating mechanism. The "Chicago school" view questions whether economies of scale, advertising and R&D expenditures can ever be a barrier to entry or isolating mechanism (Demsetz, 1974, 1982; Kitch, 1983; Stigler, 1968). Many industrial economists take an eclectic view between the two camps (Phillips, 1976; Williamson,

1975). Conner (1991) argues that the resource-based approach both reflects a strong industrial organization approach and is at the same time unique.

Peteraf (1990) suggests that the resource-based view is closer to the "Chicago school" view in emphasizing "efficiency rents" rather than "monopoly rents". However, this distinction should not be taken too far. As Demsetz notes, "there is no reason to suppose that competitive behavior never yields monopoly rents" (1973, p.3). The resource-based theory of the firm is closer to the "Harvard school" in terms of positing sustainable rents. On balance, I believe that the resource-based theory may be generating new intellectual combinations of thought (Mahoney & Pandian, 1991).

Two areas that need to be developed further, in my view are (1) an analysis of the mode of diversification within the resource-based conversation and (2) an endogenous theory of heterogeneity. The vast literature on the choice of organizational form (Williamson, 1985) may be brought to bear in predicting and prescribing the mode (acquisition, internal development) of diversification (Lamont & Anderson, 1985; Simmonds, 1990).

Unresolved in the resource-based theory is the full development of an endogenous theory of firm heterogeneity. Two approaches may be taken to address this problem. One approach is to integrate the resource-based theory with the evolutionary economics approach (see section 6 below) in which heterogeneity is explained as an outcome of a disequilibrium process of Schumpeterian competition (Iwai, 1984), path dependencies (Arthur, 1989), commitment and complementary assets.

An advantage of the disequilibrium approach is that time may be viewed as the fourth dimension of resources (along with land, labor and capital, broadly defined). Time and attention are scarce resources (Simon, 1947) and are the

sources of competitive advantage that are neglected in single-period equilibrium analysis.

The second approach utilizes the equilibrium models of industrial organization (Shapiro, 1989) to explain the nature of the heterogeneous firm. Lippman and Rumelt (1982), for example, generate an equilibrium in which firm heterogeneity is an endogenous outcome (see also Oi (1983)). The resource-based literature provides a framework within which an integrated analytical model may be constructed.

VI. An Evolutionary Theory of the Firm

I regard evolutionary theory as a particularly promising future direction for the field of strategic management. To paraphrase Alfred Marshall (1920, pp. vii; xii) the Mecca of strategy lies in strategic biology rather than strategic dynamics, and time is the center of the chief difficulty of almost every strategic problem. Firms in the real world are trying to "compete in time". Such competition suggests that we cannot ignore "real", "historical" or "subjective" time. Historical time is irreversible and irrevocable (Georgescu-Roegen, 1971) and after all, strategic management is a process in historical (real) time. Time is the important mechanism that keeps everything from happening at once.

In some sense, the five research programs of organizational economics discussed in the previous sections rely on an evolutionary story. As I have emphasized throughout the paper, the behavioral theory, the transaction cost theory, the property rights theory, the positive agency theory and the resource-based theory of the firm each posit actors with bounded rationality. An evolutionary invisible hand mechanism is compatible with theories of

bounded rationality (Langlois, 1984). Indeed, Winter (1988, p. 177), a primary theorist in evolutionary economics, agrees that organizational economics and evolutionary economics are fully compatible.

Organizational economists differ somewhat on the effectiveness of evolutionary pressures. My own view is most closely aligned with the weak-form approach of Williamson (1985). In this approach there are no Panglossian claims made but a survival of the fitter rationale is maintained (Winter, 1964). Nelson and Winter (1982) remind us that: "Selection works on what exists, not on the full set of what is feasible" (1982, p.142). The organizational economics framework involves a comparative institutional assessment among imperfect alternatives.

The evolutionary economics approach of Nelson & Winter (1982) borrows heavily from behavioral economics (March & Simon, 1958) and is a non-deterministic evolutionary theory (Loasby, 1976, 1986). Indeed, Feiwel (1985, p.56) characterizes Nelson & Winter's theory as neo-Schumpeterian and neo-Simonian. Firms are modeled as having certain capabilities and decision rules ("genes") that, over time, are modified by both deliberate problem-solving (search) efforts, entrepreneurial discovery (Kirzner, 1973) and random events (mutation). Decision rules are the generators, selection is the test. The higher-order decision rules of the firm may be interpreted as their "strategies". Natural selection and artificial selection (in terms of free human volition) winnow out firms with comparatively poor decision rules and capabilities⁵.

The organization is not only "pushed" by the past but is also "pulled" by the future. Organizational evolution is guided by images of the future (Boulding, 1978). Of course, history (experience) affects perceptions and

expectations that profoundly influence images. The paradox of organizational learning was expressed one day by Knight: "The existence of a problem of knowledge depends on the future being different from the past, while the possibility of the solution of the problem depends on the future being like the past" (1921, p.313). The real choices that the firm must make in the present separate an unknowable future from an irrevocable past (Shackle, 1972). The future is not merely unknown, but unknowable (O'Driscoll & Rizzo, 1985; Popper, 1965) and luck will play a significant role in determining which firms succeed (Alchian, 1950; Barney 1986b) under conditions of genuine ("Knightian") uncertainty. Knightian profits are the returns due to uncertainty and change. To think that a firm can maximize Knightian profits is comical, indeed. More accurately, a firm may maximize rents.

Firms evolve over time in a path-dependent (self-reinforcing) process in which multiple equilibria are conceivable ex ante but lock-ins, which may be consequences of small events, and chance circumstances can determine outcomes (Arthur, 1988). Increasing returns act to magnify chance events (Arthur, 1989). The dynamic process of a firm's evolution takes an essentially historical character (David, 1985). For example, a firm that starts out highly integrated may develop a bias toward certain kinds of innovations that further reinforce its integrated structure (Langlois & Robertson, 1989, p.375). Or, current contracting may bias future procurement choices (Aghion & Bolton, 1987).

The organizational economics/evolutionary approach (Barney, 1986c; Ulrich & Barney, 1984) maintains a functionalist imputation of efficiency⁶. Causal processes include: (1) intentionality; (2) environmental pressures; and (3) organizational learning. First, managers are posited as being expressly

interested in lowering costs and attempting to achieve the cost minimization objective with intended (but bounded) rationality. Heterogenous managers, with heterogenous "dominant logics" provide variation (planned, systematic, and random mutation) in the means devised to achieve cost minimization. Second, environmental pressures for efficiency are emphasized (particularly in agency theory). Organizational innovation is viewed as a response to environmental pressures (Chandler, 1962; Williamson, 1975). Firms that adapt quickly have a greater likelihood of being selected out (differential reproduction success). Third, the organization is posited as being capable of learning (Fiol & Lyles, 1985) and sustaining an "organizational memory" (retention) which is encoded both consciously and tacitly (Polanyi, 1962) in standard operating procedures ("routines") and corporate culture (which sometimes contains superstitious retention). In short, our "institutions of capitalism" (Williamson, 1985) are the result of both "spontaneous order" (Hayek, 1978) and human design.

Organizational routines play an important part in evolutionary economics. Routines serve the role of an endogenous mutation mechanism. Routines also serve as a comprehensive truce in intraorganizational conflict (Cyert & March, 1963), as a mechanism to encode experience (March, 1981) as a stabilizing mechanism (Simon, 1947), as organizational memory (Walsh & Ungson, 1991), and as a rule-enforcing mechanism (North, 1990). Routines can serve the function of control, replication and imitation in the organization (Nelson & Winter, 1982, p.112).

It is the dynamic interaction between the continuous and equilibrating force of imitation (heredity) and the discontinuous and disequilibrating force of innovation (mutation) which governs the evolutionary process (Day, 1984;

Iwai, 1984). Both expansion of innovators (in a "perennial gale of creative destruction"; Schumpeter, 1950, p.84) and imitation by competitors are the essence of the Schumpeterian process (Nelson & Winter, 1978; Phillips, 1971). However, a routine may involve so much idiosyncratic and "impacted" tacit knowledge that even successful replication is highly problematic, let alone imitation from a distance (Nelson & Winter, 1982, p.124). Hence, Schumpeterian competition is a dynamic process involving uncertainty, ambiguity, struggle and disequilibrium (in both an economic and metaphorical sense). The evolutionary story has strong elements of indeterminacy (Boulding, 1978; Hirshleifer, 1977, 1982; Winter, 1990).

The problem for the organizational (evolutionary) strategist is one of inferring from observation the evolutionary problems that must have existed to produce the firm behavior that we observe today (Schotter, 1981; Ullmann-Margalit, 1977, 1978). These institutions may involve both conscious collective action (Commons, 1934) and "organic" evolution of "human action without human design" in the Austrian economics tradition (Hayek, 1978; Kirzner 1979; Lachmann, 1976; Menger 1963; Schumpeter, 1934).

For those that argue that the organizational economics/evolutionary approach merely provides an ex post rationalization of institutions, I would simply reply, What of it? I submit that the approach is more honest than claiming that institutions are axiomatically deduced from "first principles". In fact, theorems usually come first and axioms follow (Allendoerfer, 1962; Ladd, 1987). Simon (1978, p.4) notes that:

In practice, it is very rarely that the existence of institutions are deduced from the functions that must be performed for system survival. In almost all cases it is the other way around; it is empirical observation of the behavior pattern that raises the question of why it persists -- what function it performs. Perhaps in an appropriate axiomatic formulation, it would be possible to deduce that every society

must have food-gathering institutions. In point of fact, such institutions can be observed in every society, and their existence is then rationalized by the argument that obtaining food is a functional requisite for all societies. This kind of argument may demonstrate the sufficiency of a particular pattern for performing an essential function, but cannot demonstrate its necessity -- cannot show that there may not be alternative, functionally equivalent, behavior patterns that would satisfy the same need.

I would argue that functionalism is necessary in order to provide a cogent evolutionary story concerning our "institutions of capitalism"⁷.

VII. Conclusion

Organizational economics offers a wide range of intellectual challenges for doctoral students in strategic management. Content (deductive economics) and process (cognitive psychology) research need to be joined in the next generation of organizational economics research. Strong forces have built intellectual isolating mechanisms that prohibit the combining of substantive and procedural rationality in the economics discipline (Simon, 1979). The relatively young field of strategic management may fill an enormous academic niche by combining process and content research in organizational economics.

There are informed and thoughtful reservations concerning organizational economics theory (see especially, Donaldson, 1990b). Organizational economics has underemphasized social rewards and has overemphasized monetary rewards (Arrow, 1985b). Organizational economics has overemphasized self-interested behavior (Perrow, 1986) and particularly, in the case of agency theory has not paid sufficient attention to the institutional context in which organizational problems are embedded.

While I agree with Barney (1990) to a certain degree, that many critiques of organizational economics have come from the vested self-interest of the uninformed, there are nonetheless some rational bases for informed criticism that have been expressed (Barzel, 1985; Brudney, 1985; Donaldson, 1990a, 1990b; Dow, 1987; Dugger, 1983; Englander, 1988; Evans & Grossman, 1983; Field, 1981; Goldberg, 1985; Hill, 1985; Langlois, 1986; Maitland, Bryson, & Van de Ven, 1985; Robins, 1987). Sober objections to organizational economics (or to any system of belief, for that matter) should be encouraged.

On the other hand, strategic management researchers have already contributed substantially to organizational economics addressing some of the very concerns listed above. In fact, almost one-third (155/489) of the citations at the end of this chapter are by business school scholars. Intellectually, organizational economics puts business school research in a far better light than many competing views from economics and finance.

Many economists have insisted that the study of the price mechanism and contracts are intellectually compelling while the study of organizational form is a less significant secondary issue. Organizational economists insist that the study of organizational form is important and is intrinsically interesting. Or to put it differently, organizational economists have provided a wealth of insights over the years in legitimizing the importance of a core concern of business school research. When looked at in this light, the mating of organizational economics and strategic management appears quite promising.

The organizational economics approach is intellectually curious. What is the origin, evolution, function and sustainability of our institutions? Why franchise contracts? Why 50-year coal contracts? Why equity joint ventures?

Why internal diversification and not acquisition? How has corporate culture evolved? Is the idea of planning a culture nonsensical? Is the notion of functionalism intellectually bankrupt?

Strategic management research may never completely solve the mysteries of our institutions of capitalism. But as we continue the conversation within the strategy field, we can do better⁸.

Endnotes

1. For those interested in the pedigree of ideas, as am I, it is interesting to note that Commons (1924, 1934) had a major influence on the thinking of both Simon and Barnard (Simon, 1979, p.499). Commons (1924, 1934, 1950) provides an overwhelming and highly idiosyncratic wealth of profound insights. To consciously attempt to recapitulate the history of thought, as I believe Commons attempted to do, demands a virtuous reader, indeed. Commons was a pragmatist in philosophy (Rorty, 1979), an instrumentalist in logic (Dewey, 1929), a behaviorist in psychology and a functionalist in law (Gonce, 1976).

2. This description of opportunism was expressed by Diamond (1971) and is taken from (Williamson, 1975, p.7). Once a famous bank robber was asked why he robbed banks. He replied: "Because that's where the money is".

3. Organizational economics, as a whole, considers the nexus of contracts metaphor as a useful "conceptual lens" but by no means the only legitimate view. Williamson (1990c, p.26) suggests: "That it has been instructive to view the firm as a nexus of contracts is evident from the numerous insights that this literature has generated. But to regard the corporation only as a nexus of contracts misses much of what is truly distinctive about this mode of organization". The unreflective metaphor is not worth living. An alternative metaphor is that the firm is a "nexus of treaties" (Williamson, 1990b) among constituencies.

4. Knight (1921, p.55) long ago observed that: "the two fundamental problems of organization are the assignment of tasks and the apportionment of rewards".

5. Indeed, the evolutionary story is more Lamarckian than Darwinian (Nelson & Winter, 1982, p.11). Commons (1924) evolutionary story of the law in the property rights tradition is similar to Nelson & Winter's (1982) evolutionary theory of the firm. Both laws and firm's decision rules are artificial evolving human conventions. There is little "naturalness" about them in a Lockean sense.

6. While Elster (1983) argues that functionalist theories are intellectually bankrupt, Donaldson (1985) offers a spirited defense of functionalism in organization theory. Langlois (1986) offers some methodological problems in combining organizational economics and evolutionary theory and suggests some unresolved issues for consideration in theory development.

7. As a final research area I would suggest that an evolutionary theory of cooperation (Axelrod, 1984) needs further development. How do we achieve interfirm and intrafirm "trust, subtlety, and intimacy?" (Ouchi, 1981, p.10). To fully understand our institutions of capitalism, the organizational economics/ evolutionary approach needs to consider the cultural "embeddedness" of the firm and the market (Banfield, 1958; Ben-Porath, 1980; Granovetter, 1985, 1990; Macneil, 1980). Trust, loyalty and truth-telling are important externalities, to phrase it economically. Ethics and morality are vital institutions that are a prerequisite for a smooth running system (Arrow, 1974; Etzioni, 1988).

8. This paper is dedicated to my father, who died on February 21, 1991. His favorite saying to me was that no matter what happens in life, no one can ever take your education from you. It is this message that I wish to pass on to doctoral students most of all.

TABLE 1

ESSENTIAL CHARACTERISTICS OF THE COMPETITIVE PROCESS THAT THE NEOCLASSICAL THEORY OF THE FIRM ASSUMES AWAY:

- | | |
|---|--|
| 1. Transaction costs and strategic behavior | (Williamson, 1975) |
| 2. Limits on rationality | (Simon, 1947) |
| 3. Difficulties of the decision-making process | (Mintzberg, Raisinghani, & Thoret, 1976) |
| 4. Problem-solving heuristics that reduce search time for a satisfactory solution | (Kahneman, Slovic & Tversky, 1982) |
| 5. "Knightian" or structural uncertainty | (Knight, 1921; Langlois, 1984) |
| 6. Technological uncertainty | (Schumpeter, 1934; 1950) |
| 7. Measurement uncertainty: | |
| (a) nonseparabilities | (Alchian & Demsetz, 1972) |
| (b) task programmability | (Eisenhardt, 1985) |
| (c) quality measurement | (Barzel, 1982) |
| 8. Constraints on factor mobility | (Doeringer & Piore, 1971) |
| 9. The role of luck | (Barney, 1986b) |
| 10. Causal ambiguity | (Lippman & Rumelt, 1982) |
| 11. Consumer or producer learning | (Lieberman & Montgomery, 1988) |
| 12. Prices as signals of quality | (Spence, 1974) |
| 13. Diffuse alertness | (Kirzner, 1973) |
| 14. Indivisibility and sunk costs | (Arrow, 1985a) |
| 15. Inappropriability (externalities) | (Olson, 1965; Wolf, 1988) |

TABLE 2

MICROECONOMIC THEORIES OF THE FIRM:

THEORY OF THE FIRM (and relevant strategy concern)	RATIONALITY OF ACTORS	DECISION-MAKING FOCUS	SELF-INTEREST ORIENTATION
Neoclassical (little)	Unbounded	Substantive	self-interest
1. Behavioral (cognition)	Bounded	Substantive & Procedural	self-interest
2. Transaction costs (vertical integration)	Bounded	Substantive & Procedural	self-interest & strategic ¹
3. Property rights (culture)	Bounded	Substantive & Procedural	self-interest & strategic
4. Agency theory:			
(a) principal-agent (little)	Unbounded	Substantive	self-interest
(b) positive agency (corporate finance)	Bounded	Substantive & Procedural	self-interest & strategic
5. Resource-based (diversification)	Bounded	Substantive & Procedural	self-interest
6. Evolutionary (population ecology)	Bounded	Substantive & Procedural	self-interest

¹ "Strategic", in this context, refers to the fact that some people may attempt to play outside the "rules of the game".

TABLE 3

MOTIVES FOR VERTICAL CONTROL:

<u>Motive</u>	Paper suggesting vertical financial ownership	Paper suggesting vertical contract
entry barriers	(Bain, 1968; Porter 1980)	exclusive dealing contract (Comanor & Frech, 1985) tying contracts (Whinston, 1990)
circumventing regulation	(Dayan, 1975)	transfer pricing via equity joint venture (Blois, 1972)
maintaining oligopolistic coordination	(Adams & Dirlam, 1964)	tying contracts or resale maintenance (Burstein, 1960a)
successive monopoly	(Spengler, 1950; Greenhut & Ohta, 1976)	franchise fee or resale price maintenance (Rey & Tirole, 1986)
bilateral monopoly	(Williamson, 1971)	contract bargaining (Machlup & Taber, 1960)
upstream monopoly	(Vernon & Graham, 1971; (Schmalensee, 1973)	tying contract (Burstein, 1960a; Blair & Kaserman, 1983)
price discrimination	(Crandall, 1968; Perry, 1980)	tying contract (Burstein, 1960b; Blackstone, 1975) territorial restrictions coupled with resale price maintenance (Phillips & Mahoney, 1985)

TABLE 3 (continued)

<u>Motive</u>	Paper suggesting vertical financial ownership	Paper suggesting vertical contract
reduce asymmetric information	(Arrow, 1975)	vertical contract (Teece, 1982)
reduce or transfer risk	(Carlton, 1979)	long-term contract (Carlton, 1979)
assure supply	(Walker & Weber, 1987) (Pfeffer & Salancik, 1978)	collateral & deferred rebates (Goldberg, 1979)
control quality and services	(Harrigan, 1986)	exclusive territories (Goldberg, 1979) resale price maintenance (Marvel & McCafferty, 1984)
reduce shirking	(Alchian & Demsetz, 1972)	relational contract (Williamson, 1979)
reduce technological uncertainty	(Teece, 1982)	joint venture (Hennart, 1988a)
appropriate R&D spillover	(Teece, 1980)	vertical contract (Evans & Grossman, 1983)
trading of technology	(Arrow, 1970)	joint venture (Kogut, 1988)

TABLE 4

The Isomorphic Nature of the Theory of governance structure (industrial organization) and capital structure (corporate finance)

Linking property rights theory to transaction cost theory and agency theory:

Property rights theory:

In the absence of agency and transaction costs, the assignment of property rights (liability rules) does not matter (Coase, 1960).

Transaction costs theory of the firm:

In the absence of agency and transaction costs, governance structure (make or buy) does not matter (Coase, 1937; Williamson, 1975).

With high asset specificity, a make decision ("internal procurement") is more likely (Williamson, 1979).

Agency and corporate finance theory:

In the absence of agency and transaction costs, capital structure (equity or debt) does not matter (Modigliani & Miller, 1958).

With high asset specificity, equity financing (retained earnings; "internal procurement") is more likely (Williamson, 1988b).

TABLE 5

ISOLATING MECHANISMS:

- | | |
|--|---|
| 1. Resource position barriers | (Wernerfelt, 1984) |
| 2. Unique or rare resources which are not perfectly mobile | (Barney, 1991) |
| 3. Unique managerial talent that is inimitable | (Penrose, 1959) |
| 4. Resources with limited strategic substitutability by equivalent assets | (Dierickx & Cool, 1989) |
| 5. Valuable, nontradeable or imperfectly tradeable resources | (Dierickx & Cool, 1989) |
| 6. Unique combinations of business experience | (Prahalad & Bettis, 1986; Spender, 1989) |
| 7. Corporate culture that is valuable, rare, and imperfectly imitable due to social complexity | (Barney 1986a; Fiol, 1991; Kreps 1990a) |
| 8. Culture that is the result of human action but not by human design | (Arrow, 1974; Camerer & Vepsalainen, 1988; Hayek, 1978) |
| 9. Invisible assets that by their very nature are "hard to see" (and imitate). | (Itami, 1987) |
| 10. Valuable heuristics and processes that are not easily imitated | (Schoemaker, 1990) |
| 11. Time compression diseconomies | (Dierickx & Cool, 1989) |
| 12. Schumpeter's resource combinations | (Schumpeter, 1934) |
| 13. Team embodied skills | (Nelson & Winter, 1982) |
| 14. Organizational innovation that is characterized by a slow diffusion process | (Armour & Teece, 1978; Mahajan, Sharma & Bettis, 1988) |
| 15. Unique historical conditions in which firm-specific skills and resource combinations result in path dependencies and heterogeneity over time | (Arthur, 1989; Barney 1991; De Gregori, 1987) |
| 16. Idiosyncratic assets | (Williamson, 1979) |

17. Uncertain imitability due to bounded rationality and causal ambiguity (Lippman & Rumelt, 1982)
18. The rich connections between ambiguity and uniqueness (Demsetz, 1973; Reed & DeFillippi, 1990)
19. Co-specialized assets (Teece, 1987)
20. Reputation (Klein & Leffler, 1981; Kreps & Wilson, 1982; Kreps, 1990a)
21. Private or asymmetric information and knowledge as strategic resources (Eisenhardt, 1989; Winter, 1987)
22. First-mover advantages in acquiring information and other valuable resources that inhibit imitation (Lieberman & Montgomery, 1988)
23. Firm-specific knowledge of buyers & sellers, and worker's capabilities (Prescott & Visscher, 1980)
24. Imperfect factor markets (Barney, 1986b)
25. Ill-defined property rights (Alchian & Demsetz, 1973)
26. Patents, trademarks, and copyrights (Alchian, 1982)
27. Investments that entail high exit barriers and high switching costs (Porter, 1980)
28. High sunk cost investments (Baumol, Panzar & Willig, 1982)
29. Learning and experience curve advantages that are kept proprietary (Lieberman, 1987; Spence, 1981)
30. Legal restrictions on entry (Stigler, 1968)
31. Economies of scale combined with imperfect capital markets (Bain, 1968)

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